Artificial Intelligence Forecasting of Covid-19 in China

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Abstract

BACKGROUND An alternative to epidemiological models for transmission dynamics of Covid-19 in China, we propose the artificial intelligence (AI)-inspired methods for real-time forecasting of Covid-19 to estimate the size, lengths and ending time of Covid-19 across China. METHODS We developed a modified stacked auto-encoder for modeling the transmission dynamics of the epidemics. We applied this model to real-time forecasting the confirmed cases of Covid-19 across China. The data were collected from January 11 to February 27, 2020 by WHO. We used the latent variables in the auto-encoder and clustering algorithms to group the provinces/cities for investigating the transmission structure. RESULTS We forecasted curves of cumulative confirmed cases of Covid-19 across China from Jan 20, 2020 to April 20, 2020. Using the multiple-step forecasting, the estimated average errors of 6-step, 7-step, 8-step, 9-step and 10-step forecasting were 1.64%, 2.27%, 2.14%, 2.08%, 0.73%, respectively. We predicted that the time points of the provinces/cities entering the plateau of the forecasted transmission dynamic curves varied, ranging from Jan 21 to April 19, 2020. The 34 provinces/cities were grouped into 9 clusters. CONCLUSIONS The accuracy of the AI-based methods for forecasting the trajectory of Covid-19 was high. We predicted that the epidemics of Covid-19 will be over by the middle of April. If the data are reliable and there are no second transmissions, we can accurately forecast the transmission dynamics of the Covid-19 across the provinces/cities in China. The AI-inspired methods are a powerful tool for helping public health planning and policymaking.